CHAPTER I

INTRODUCTION

1.1 Introduction

Permanent deformation or rutting is the primary failure mode of hot mix asphalt pavements. Failure due to rutting compromises serviceability of pavement and can pose danger to road user. A variety of laboratory test methods have been developed in order to gain a better understanding of rutting of hot mix asphalt pavements. Wheel tracking is the latest addition to laboratory equipment. Wheel tracking devices subject asphalt pavement to cyclic loads by a moving wheel so that the permanent deformation or rutting experienced by the pavement can be determined.

This test enables engineers and researches to mimic the actual condition experienced by the pavements, thus enabling them to design pavement mixes which are more durable and less costly to maintain.

1.2 Problem Statement

After a new pavement is constructed, both environmental and traffic stresses cause it to deteriorate. The rate of deterioration depends on the severity of the traffic loads and the variability of the road materials. In the evaluation process, the identification and classification of the type of failure is necessary if correct remedial treatments are to be undertaken. Pavement engineers are faced with the difficult task of evaluating pavements that have been subjected to varying traffic loads under variable environmental conditions and material properties. Field measurements are valuable practical tools in the evaluation of road performance and in the identification of the causes of failure. The task becomes more difficult if the pavement has gone through a series of previous unrecorded maintenance treatments.

To ensure a good return on the investment in road construction, a cost benefit analysis is needed to ensure that the most cost effective method of maintenance is employed. If the future performance of the road is not correctly predicted, then large sums of money may be wasted in maintenance alone. Thus, there is a need to carry out research on the rutting potential of hot mix asphalt in variable conditions so that pavement engineers can estimate the right time frame within which the pavement is mostly likely to undergo repair or rehabilitation works.

1.3 Objectives of the Study

The objectives of this study are as follows: -

1. To develop regression equations to predict rut depths for different environment exposure conditions and number of wheel track passes.

1.4 Scope of the Study

The scope of this study involves calibrating the wheel track gauges and developing regression equations to predict rutting potential of hot mix asphalt in variable conditions. The entire test is conducted at Makmal Pengangkutan, UTM Skudai.

1.5 Significance of the Study

From the result of the study, the relationship between rutting potential of hot mix asphalt in variable conditions will be established. Number of wheel passes and rut depth is correlated to derive a mathematical equation based on respective exposure conditions. By establishing this mathematical equation, future rut depth respective to number of wheel passes on variable exposure conditions can be determined. Therefore, this study would not only give pavement engineers a better understanding of hot mix asphalt behaviour under different variable conditions, but enable them to carry out rehabilitation and repair works in a more scheduled and systematic manner.